"Dedicated to Public Service"

THE RADIATOR

Golden Empire Amateur Radio Society, Inc.

Chico

SPECIAL SERVICE CLUB

W6RHC
IRLP #8170

www.gearsw6rhc.org

P.O.Box 202 Chico, CA 95927

April 2021 Newsletter	GEARS Founded August 13, 1939

Since GEARS members are getting vaccinated, we can start holding in person meetings again. Hopefully this summer!

We are holding a GEARS picnic Saturday April 24th Noon at Wildwood Park Chico. No charge. Come out and join us.

On the GEARS General Meeting Zoom call, we had a great presentation of Wires X by Rich Astley N3UOR and VHF/UHF by Michael Favor N6FAV.
You can watch the meeting here: https://youtu.be/CBdiXtY0wrE

According to the Federal Register, new license fees are scheduled to go into effect April 19. Renew your license before then if you can.

I've posted some old GEARS photos online, see links at the end of this newsletter.

Field Day will be June 26-27. We have reserved the Masonic Lodge again this year. We will also have a BBQ on Saturday. Come on out!

I want to thank everyone who paid their GEARS 2021 dues. Your support keeps our club alive.

Happy April Birthdays to members Larry Mitchell KF6NCX and David Ramsey KK6WUH.

Things are looking better now. I hope to see all of you sometime soon. Come out to the April BBQs.

Take care and stay safe.

'73
Jim Matthews K6EST
jiminchico@yahoo.com
530-893-3314

Join GEARS on Facebook
www.facebook.com For timely news and additional information.

April 2021 Calendar

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	t			1 7pm PARS Net 7:30pm Simplex Net	2	3
4 EASTER 8pm OARS Net VEC Testing Chico	5 7pm GARS Net 8pm ARES Net	6 7:30pm GEARS Net 7pm ARES meeting	7	8 7pm PARS Net 7:30pm Simplex Net	9 7pm GARS & OARS Meetings	10
11 8pm OARS Net	12 7pm GARS Net 8pm ARES Net	13 7:30pm GEARS Net	14 GEARS Board Mtg.	15 7pm PARS Net 7:30pm Simplex Net	16 7pm GEARS Meeting online	17
18 8pm OARS Net	19 7pm GARS Net 8pm ARES Net	20 7:30pm GEARS Net	21	22 7pm PARS Net 7:30pm Simplex Net	23	24 9am OARS Breakfast Noon GEARS BBQ
25 8pm OARS Net	26 7pm GARS Net 8pm ARES Net	37 7:30pm GEARS Net	28	29 7pm PARS Net 7:30pm Simplex Net	30	

VEC Testing, FCC License Exam available by appointment. For information or registration call Tom Rider, W6JS 514-9211
Chico Breakfast Canceled until things settle down with the COVID-19 virus.
GEARS Board Meeting 2nd Saturday online.
OARS Meeting Second Friday of the month, TBD (To Be Determined)
GARS Meeting Second Friday of the month, TBD
Butte ARES Meeting 3rd Tuesday, TBD Contact Dale Anderson, KK6EVX 826-3461 for more information.
GEARS Meeting, third Friday of the month, online till further notice pm, meeting at 7:00 pm.
OARS Breakfast 4th Saturday of the month TBD

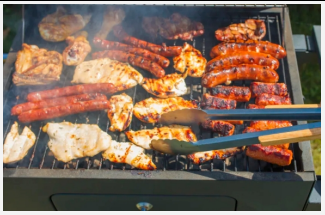
NETS:
OARS Club Net Sunday 8pm 146.655 Mhz - PL 136.5
GARS Club Net:Monday,7:00 pm 147.105 MHz + PL 110.09
Butte ARES Net Mondays 8pm 145.290 MHz - PL 110.9
Yuba Sutter Club Net Monday 7pm 146.085 MHz + PL 127.3
GEARS Club Net Tuesdays 7:30 PM 146.850 MHz - PL 110.9
PARS Club Net Thursday 7pm 145.290 - PL 110.9
Simplex Net Thursday 7:30 p.m. 146.52 no tone
Yuba Sutter ARES Net Thursdays 7pm 146.085 MHz + PL 127.3
Sacramento Valley Traffic Net Nightly 9:00 PM 146.850 MHz - PL 110.9

GEARS Century Members

Dale Anderson Kent Hastings
Bennett Laskey Tony Nasr
Scott Roberts
We thank these members for their extra support.

GEARS BBQ Picnic

Saturday April 24th Noon
Wildwood Park Chico. Manzanita Ave & East Ave.
No charge, just bring your own food, beverages and some food to share. We will also hold a raffle.



IT IS JUST AN APRIL'S FOOL JOKE

The event I would like to discuss happened on April 1, 1966.

At the time I was stationed with the Coast Guard at the CG Radio Station New Orleans, NMG. I was on the afternoon watch at the ship to shore position when the excitement started.

A supertanker was reported to be on fire in the Gulf of Mexico. Nothing was heard of this on 500 kHz, CW the distress and calling frequency. The call had come in via ham radio on the 40-meters phone band but the station was using CW (Continuous Wave or Morse code). Ships and planes were launched heading towards the position that was reported.

I was relieved of my watch and sent to the ham station on the base to assist. All I was told was that we were having a hard time getting a good position fix using radio direction finding stations.

After arriving I learned that the operator was trapped in the radio room and the water was rising inside the room. It was then I became a little suspicious. I know where the radio room is on a supertanker and if the water was coming in then the ship would have been almost completely submerged. But the Coast Guard takes every distress call seriously until proven to be a fake.

The operator professing to be on the ship said he thought he could get out by swimming under the fire. I told him to go ahead and leave but before he did to lock his key so we could get a good bearing on his location.

The carrier was constant for a short time and then went silent. We did not know why at the time. The FCC mobile direction finder station was within blocks and the carrier allows them to hone into his front door in the city of New Orleans, LA.

The operator was a 17-year-old ham radio operator who wanted to play an April Fool's joke. I never heard what the sentencing was but I talked to the FCC Field Engineer right after he was found guilty but before sentencing. I was told the FCC was asking for maximum sentencing. That means he may have spent as much as 10 years in federal prison.

The moral of the story is: DO NOT GIVE FALSE DISTRESS CALLS. It is expensive to launch a search and it could endanger the lives of those seeking to assist.

From hamslife.com

GEARS Repeaters

GEARS West on St. John
145.410 MHz PL is 123.0 Negative offset.
PL both input and output (CTSS)

GEARS East in Forrest Ranch
146.850 MHz Negative offset. PL 110.9 CTSS
440.650 MHz Plus offset, PL 110.9 Hz

Antenna Construction -- Choosing the Right Materials

By Steve Vansickle, WB2HPR

Last month's tech topic touched on the importance of weather-proofing antenna connections and components to help guard against corrosion. This time, let's take a few minutes to consider some criteria for antenna material selection. We'll limit this discussion to outdoor wire antennas, since they are very popular and are commonly constructed by many operators. Wire antennas would include dipoles, end-fed Zepps, off-center fed (OCF), the popular G5RV, and slopers, to name a few. There are, of course others, but the same principles apply.

The main component of these wire antennas is the wire itself, which acts as both support and active radiator. The antenna wire will be under great stress, from stretching due to weight between insulators, and the weight of the feedline, or cable, which may also be pulling on the wire. Added factors would include wind loading, as well as ice accumulation during winter weather.

There are several types of wire that may be used to perform this not-so-small feat. One possibility is copper-clad steel antenna wire. AWG 14 copper-clad steel has a rated strength of 224 ft-lbs and will provide many years service under normal conditions. It is only sold from suppliers such as DX Engineering, Davis/RF, Wireman, and others. You will not find this at your usual electrical wholesaler or big-box store. This wire is sometimes available tinned, as well. The advantage of copper-clad steel is high strength, minimal wind resistance and good conductivity. This would be a great choice for constructing any of the wire antenna types mentioned earlier.

An alternate is THHN wire. This is commonly available from hardware stores or home centers. This wire is insulated drawn copper wire, coated with Thermoplastic, High Heat and Nylon coated (hence THHN) for insulating purposes. It is commonly used for transmission of electrical power in many industrial applications. Since it is readily available, it is a often used for amateur antenna applications, usually AWG 10-14. An advantage of THHN wire is that the insulation serves to protect the copper from corrosion. Also, there is some evidence that is less prone to static build-up. The downside is that the insulation contributes weight to the wire, and due to the velocity factor of the insulation, you will need to compensate for differences in length, versus your computed value, and adjust accordingly.

Also, because insulated wire is larger in diameter per AWG, it can accumulate a greater ice and wind load. This can put extra stress on the wire supports and insulators. If you try to compensate with larger diameter (greater AWG), you will add to the total weight and stress on the supports – kind of a catch 22! Another key component of wire antennas is the insulators, which are found at the feed point and the ends of the wire. Quality and type of material is critical because they serve to protect from shock and fire hazard, as well as support the wire, feedline or coax cable, and any associated matching devices such as ununs or baluns.

Materials that can meet these demands include glass, glazed porcelain, and plastic. The best insulating properties may be found in tempered glass. Properly constructed, they can provide exceptional dielectric strength and will withstand great mechanical tension. The drawback is that they must be handled carefully – they are, after all, glass, and they can be a bit pricey.

Alternatively, glazed porcelain insulators are a good choice. Although the glaze can be chipped, they offer excellent electrical and mechanical properties. A third choice would be plastic insulators. These are commonly available from suppliers, and are inexpensive and light in weight. However, they may not have the longevity of glass or porcelain due to inferior UV resistance. Despite this drawback, plastic insulators are used extensively in the construction of many antenna types. Other types of insulators may be user made from recycled plastic, Plexiglas, or PVC pipe. Bear in mind the limitations of mechanical and dielectric strength, as well as UV exposure. Wood, both varnished and paraffin impregnated, has seen service as antenna insulators.

Finally, we need to consider the type of support to be used when a wire antenna is held up to a mast, tower, pole, or tree. This can be one of the weakest points of the entire antenna setup. It is important to again consider mechanical strength and UV resistance. Don't be tempted to use that old piece of manila clothes line that you thought was too good to throw away! A proper support rope or catenary or halyard must be made to withstand great mechanical stress, and be highly resistant to UV radiation. Otherwise, it is guaranteed to fail. Antenna support rope (line) is made specifically for this application. Dacron polyester is a great choice – it is available in several diameters, has low stretch, is UV resistant, and is easy to tie.

One of the Hamfest sponsors, Mastrant, sells a premium support rope. See their website where you will find information to help determine the size rope you need. Ordinary paracord is a poor choice, and will likely deteriorate from sunlight and fail in a year's time. As me how I know! Likewise, cheap plastic rope sold in discount centers will become brittle and fall apart. And it can be devilish to tie a knot.

The bottom line: Study your options – select the best materials types for the job. Your choice must be a balance of availability, suitability, and budget constraints. Buy from established, reputable suppliers, such as those found in QST. Finally, if you're unsure about what to use, ask a fellow club member for help or advice. Another good resource is the ARRL Antenna Book – available from the League. Remember – the antenna is the biggest and most important part of your radio system. A proper installation, using the best available materials, will result in a dependable antenna that can provide great performance for many years. Put it up once – put it up right!

As always – SAFETY FIRST! Next time: Antenna feed line tips.

Return of the Vacuum Tube

By Jon Cartwright

Peer inside an antique radio and you'll find what look like small light bulbs. They're actually vacuum tubes—the predecessors of the silicon transistor. Vacuum tubes went the way of the dinosaurs in the 1960s, but researchers have now brought them back to life, creating a nano-sized version that's faster and hardier than the transistor. It's even able to survive the harsh radiation of outer space.

Developed early last century, vacuum tubes offered the first easy way to amplify electric signals. Like light bulbs, they are glass bulbs containing a heated filament. But above the filament are two additional electrodes: a metal grid and, at the top of the bulb, a positively charged plate. The heated filament emits a steady flow of electrons, which are attracted to the plate's positive charge. The rate of electron flow can be controlled by the charge on the intervening grid, which means a small electric signal applied to the grid—say, the tiny output of a gramophone—is reproduced in the much stronger electron flow from filament to plate. As a result, the signal is amplified and can be sent to a loudspeaker.

Vacuum tubes suffered a slow death during the 1950s and '60s thanks to the invention of the transistor—specifically, the ability to mass-produce transistors by chemically engraving, or etching, pieces of silicon. Transistors were smaller, cheaper, and longer lasting. They could also be packed into microchips to switch on and off according to different, complex inputs, paving the way for smaller, more powerful computers.

But transistors weren't better in all respects. Electrons move more slowly in a solid than in a vacuum, which means transistors are generally slower than vacuum tubes; as a result, computing isn't as quick as it could be. What's more, semiconductors are susceptible to strong radiation, which can disrupt the atomic structure of the silicon such that the charges no longer move properly. That's a big problem for the military and NASA, which need their technology to work in radiation-harsh environments such as outer space.

"The computer you and I buy is what NASA buys, but they won't want it exactly the same way," says Meyya Meyyappan, an engineer at NASA Ames Research Center at Moffett Field in California. "It takes them a few years to radiation-proof it. Otherwise the computer you put in the space shuttle or the space station basically will get zapped and stop working."

The new device is a cross between today's transistors and the vacuum tubes of yesteryear. It's small and easily manufactured, but also fast and radiation-proof. Meyyappan, who co-developed the "nano vacuum tube," says it is created by etching a tiny cavity in phosphorous-doped silicon. The cavity is bordered by three electrodes: a source, a gate, and a drain. The source and drain are separated by just 150 nanometers, while the gate sits on top. Electrons are emitted from the source thanks to a voltage applied across it and the drain, while the gate controls the electron flow across the cavity. In their paper published online today in Applied Physics Letters, Meyyappan and colleagues estimate that their nano vacuum tube operates at frequencies up to 0.46 terahertz—some 10 times faster than the best silicon transistors.

The team's device isn't the first attempt at miniaturizing the vacuum tube. Contrary to previous work, however, the researchers do not need to create a "proper" vacuum: The separation of the source and drain is so small that the electrons stand very little chance of colliding with atoms in the air. This is a huge benefit, says Meyyappan, because it opens the door to mass production.

Electronics engineer Kristel Fobelets at Imperial College London agrees. "Vacuum technology within a semiconductor fabrication line would make fabrication costs very high," she says. Still, she cautions, the nano vacuum tube is more of a "proof of concept" than a working device, since its operational requirements do not yet match modern transistors. As one example, about 10 volts is needed to switch the device on, whereas modern transistors operate at about 1 volt; in this respect, the nano vacuum tube isn't compatible with modern circuits.

Even so, the potential is great, says Meyyappan. The new vacuum tube's inherent immunity to radiation could save the military and NASA a lot of time and money, while its faster operation makes it a rare candidate for so-called terahertz technology. Sitting between the microwave and infrared regions of the electromagnetic spectrum, the terahertz region can pick out the "fingerprints" of certain molecules. The technology could therefore be used at airports to safely scan for illicit drugs, for instance.

So are vacuum tubes poised to make a comeback? Meyyappan thinks so. "We are combining the best of the vacuum," he says, "and the best of what we have learned in the past 50 years about integrated-circuit manufacture."

From: TechnologyPhysics May. 2012

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GEARS Radiator past issues are available at:
https://drive.google.com/drive/folders/0B-jPu0P0RkymZ2Q1WDR6THZLNmM?usp=sharing

Some GEARS photos are now posted online:
GEARS Steak Bake 1969
https://photos.app.goo.gl/euv1NPHCjtwAcwT69

GEARS Ham Fest 1989
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